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TITLE: Corkscrew has a lever action with two piston elements which are linked by a coupling system

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PRIORITY-DATA: 2002DE-2019538 (December 16, 2002)

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## PATENT-FAMILY:

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## APPLICATION-DATA:

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ABSTRACTED-PUB-NO: DE 20219538U

## BASIC-ABSTRACT:

NOVELTY - A corkscrew has a housing which fits onto the neck of a bottle via clamping arms and with two internal pistons. The upper piston carries the corkscrew, and is linked to two outer hinge action levers. The lower piston is connected to the upper piston via automatic coupling arms. The corkscrew is fitted onto the neck of a bottle and the screw is driven into the cork by a simple lever action. The lever action is reversed to couple the piston together and pull the cork out of the bottle. The cork is released by a return action of the outer levers.

USE - Corkscrews

ADVANTAGE - A simple lever action operation to fit, extract and discard corks

DESCRIPTION OF DRAWING(S) - The drawing shows a schematic of a corkscrew action.

Upper piston 5

Lower piston 4

Corkscrew spiral 3

20.01.03

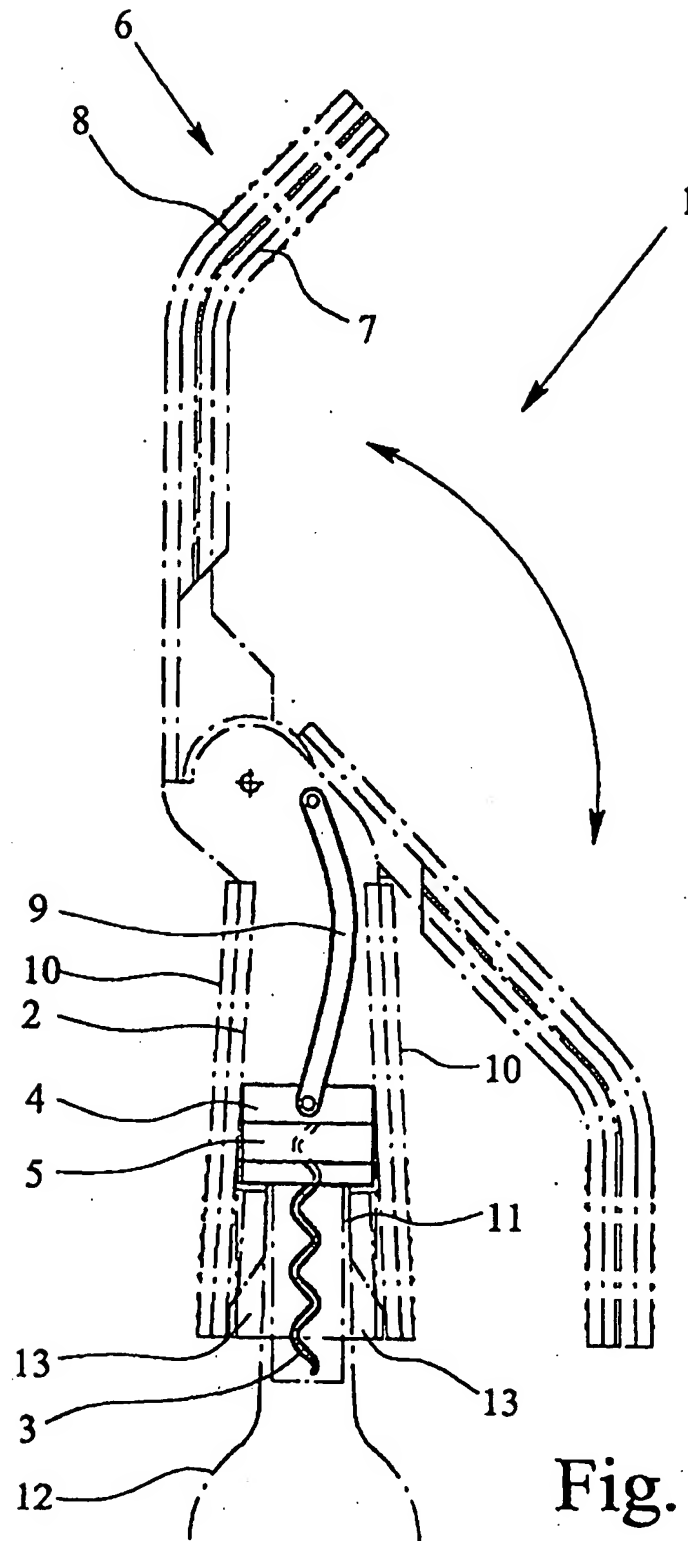


Fig. 1

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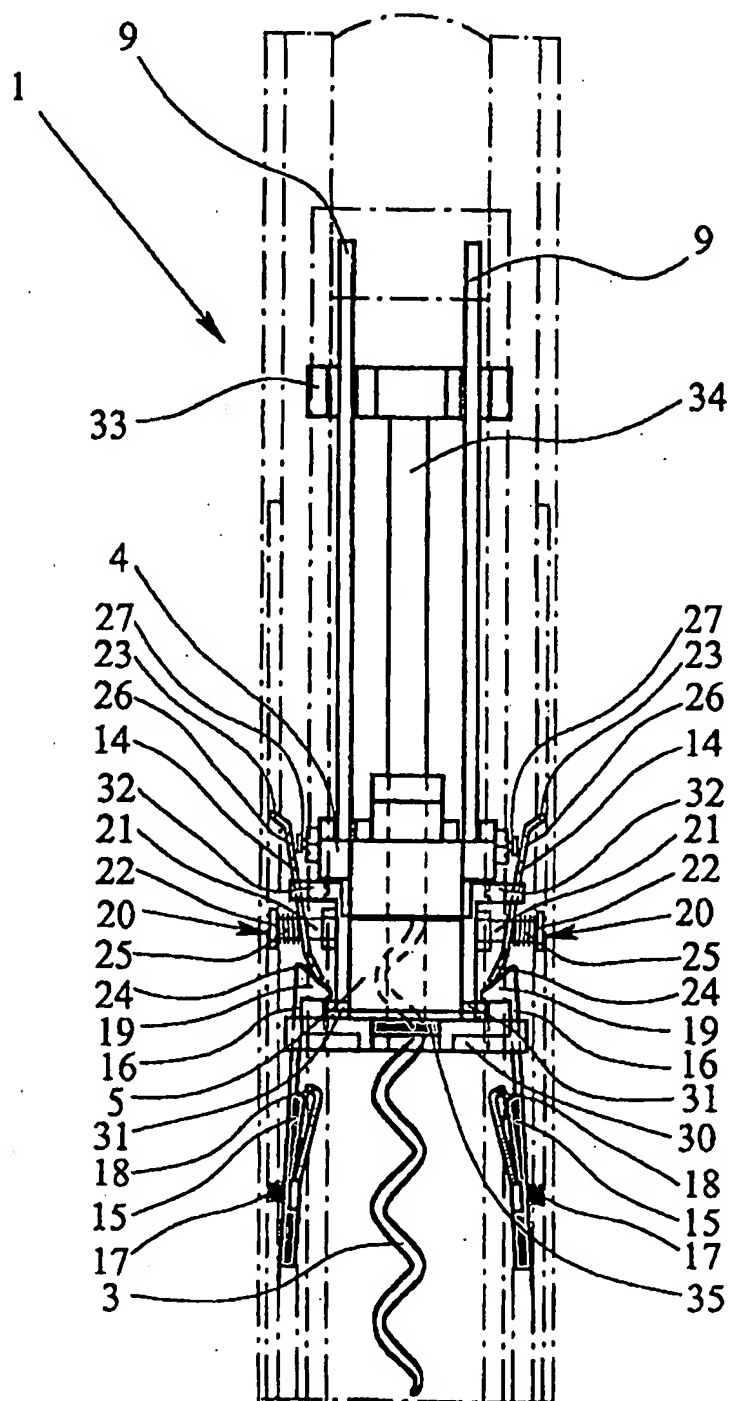


Fig. 2

DE 202 19 538 U1

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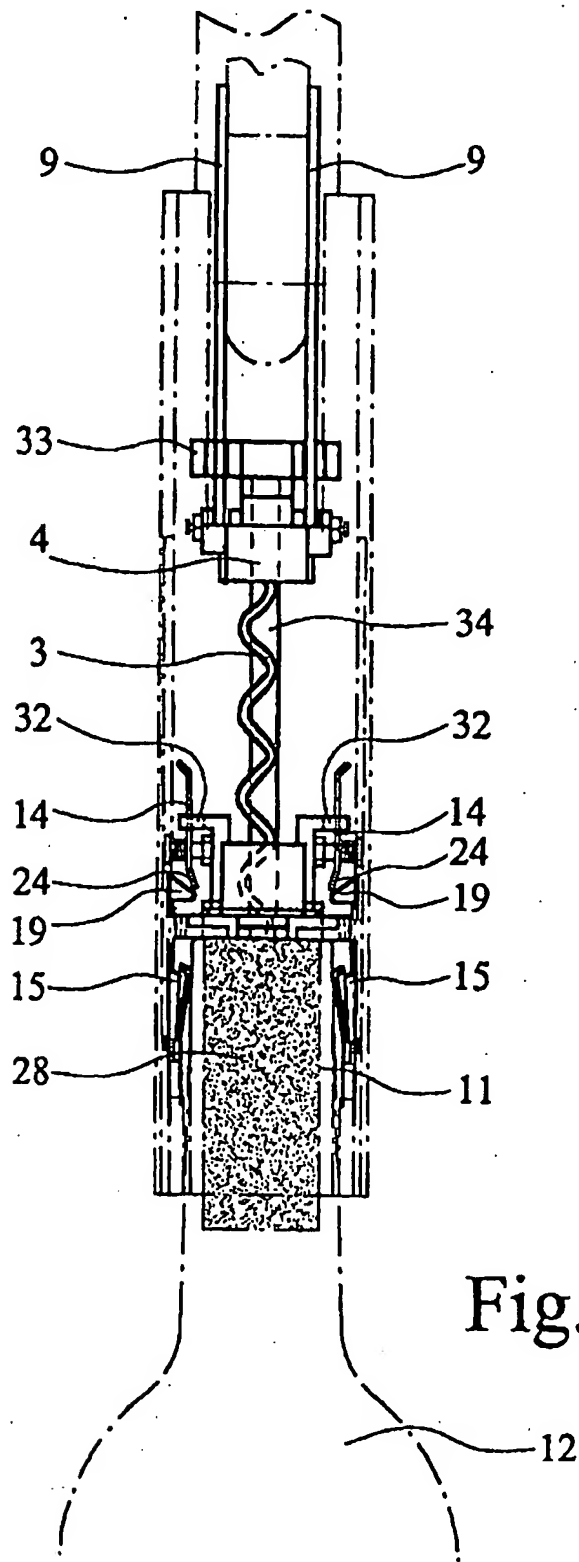


Fig. 4

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[illegible]

Fig. 5

DE 202 19 538 U1

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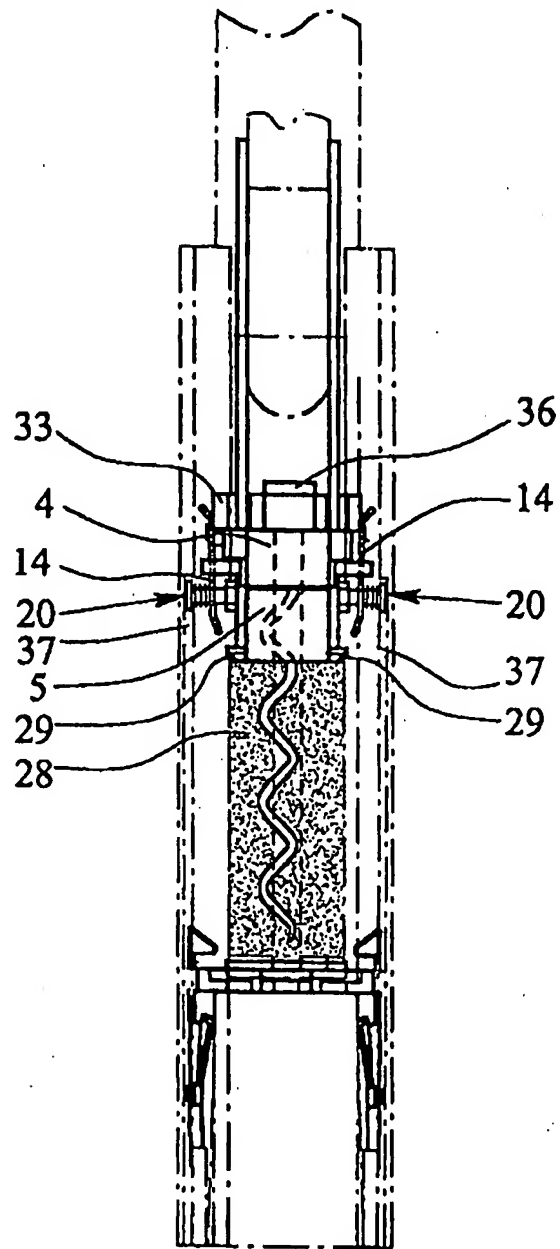


Fig. 6

DE 202 19 538 U1

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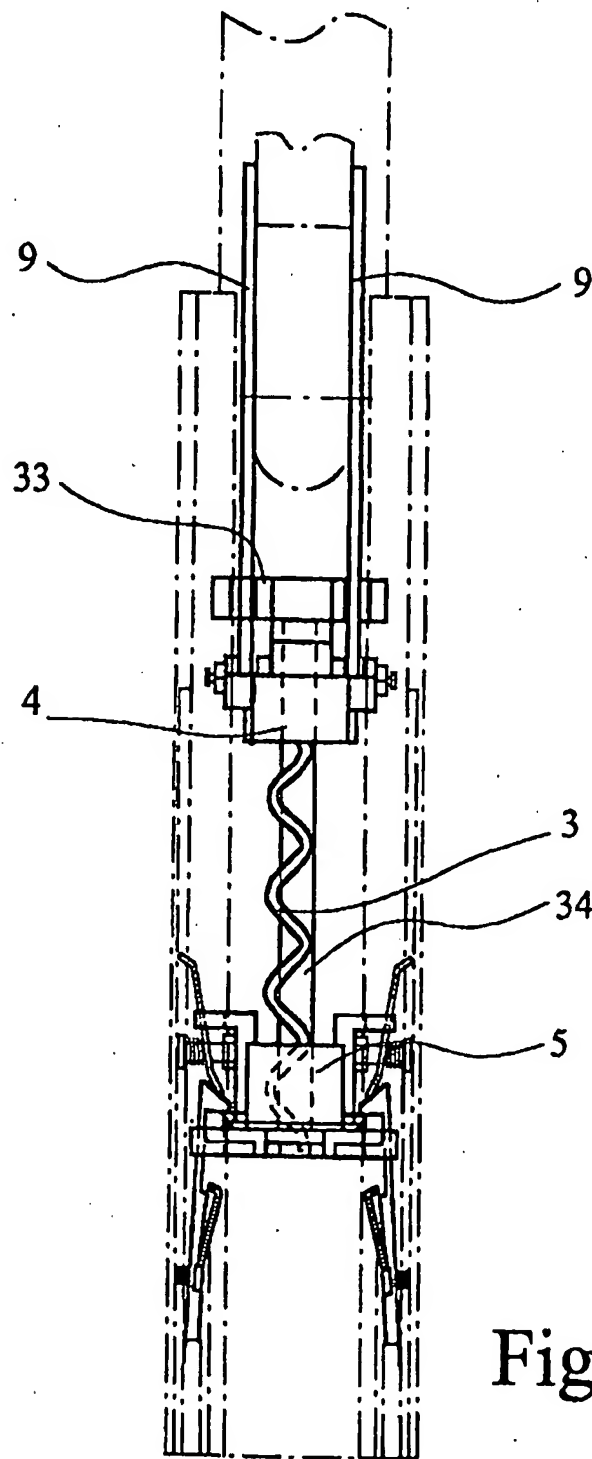


Fig. 3

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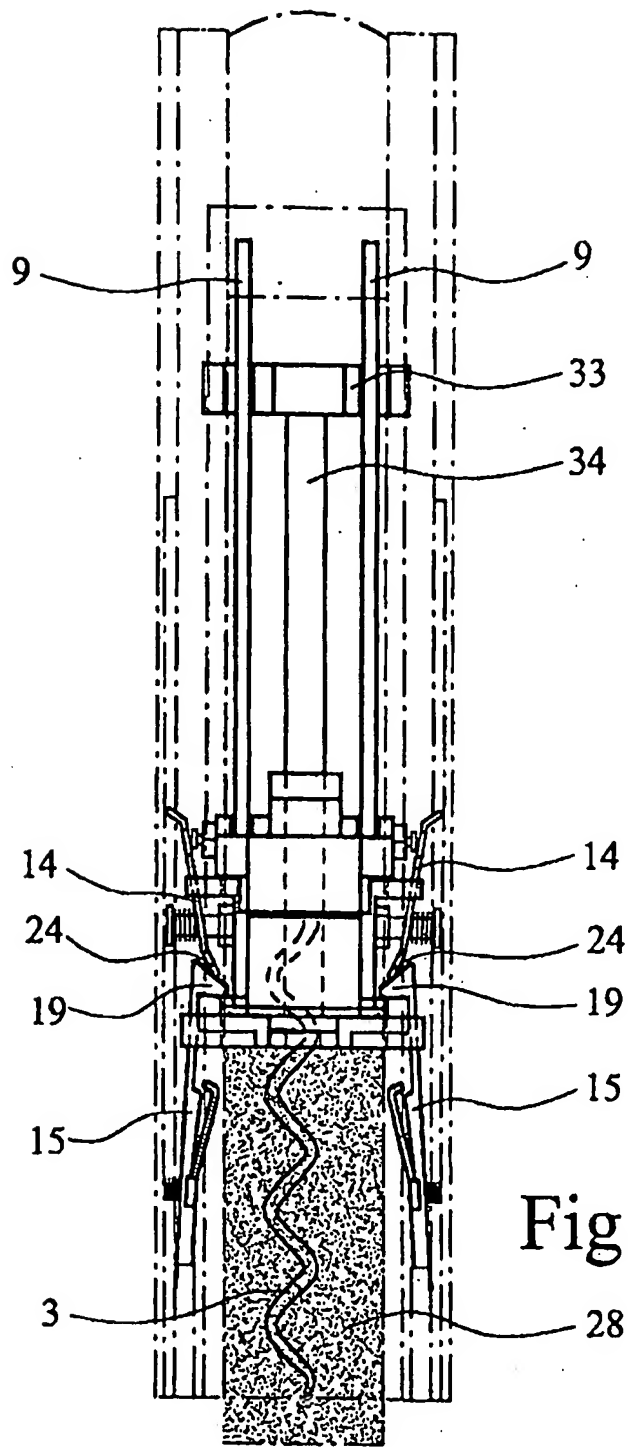


Fig. 7

DE 202 19 538 U1



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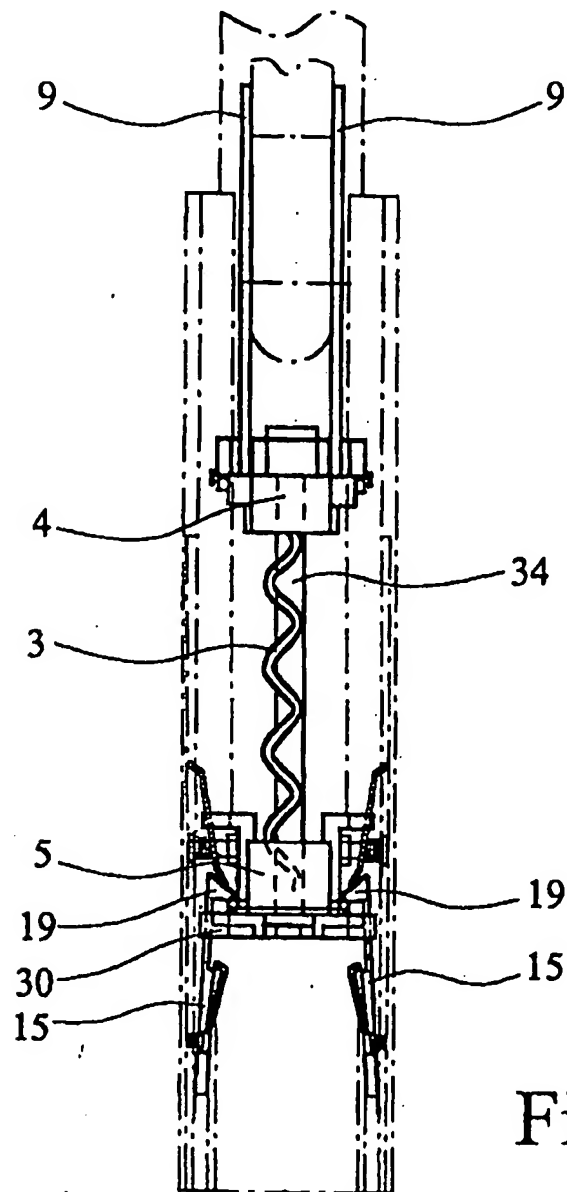
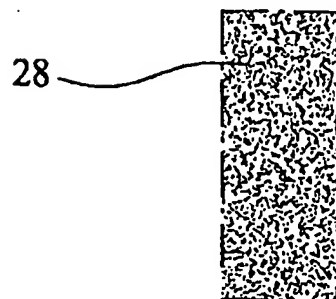


Fig. 8



DE 202 19 538 U1

## English language translation of specification of German Patent DE 20219538

## Corkscrew

The invention relates to a corkscrew having an upper piston part, which is arranged within a housing such that it is  
5 displaceable in the longitudinal direction and is provided for mounting a screw, and a lower piston part which is arranged within the housing such that it is displaceable in the longitudinal direction, having at least one coupling element for coupling the piston parts and having two outer  
10 clamping levers hinged to the outside of the housing for the purpose of clamping a bottle neck guided into the housing.

A corkscrew of the type mentioned at the outset is already  
15 known from DE 696 14 254 T2. The known corkscrew comprises a hollow body whereof the interior is constructed in the form of an axially stepped opening, the upper, wider portion of the said stepped opening being constructed such that it can receive a bottle neck containing a cork to be  
20 pulled out. The upper and narrower portion of the said opening contains a piston arrangement. The piston arrangement supports a screw which is provided to be guided into the said cork by way of a cover provided at one end of the screw. The corkscrew furthermore has an outer lever  
25 which is equipped with a handle provided at its end in order to be actuated manually during the procedure for pulling out the cork. The corkscrew furthermore has a piston arrangement having a lower piston part which is axially displaceably arranged in the upper portion of the  
30 said stepped opening in order to guide the said screw when this is displaced in the longitudinal direction. Means are moreover provided to prevent the nut from rotating. The known corkscrew furthermore has two diametrically opposed

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outer clamping levers which are provided with inwardly facing mandrel-like upper and lower projections. The lower projections serve as elements for clamping the corkscrew on the bottle neck whilst the upper projections serve to hold the lower piston part in its bottom-most position when the pulled cork is slipped off the screw. Finally, the known piston arrangement has two lateral clamping elements on the upper piston part, which are each rotatably hinged to the upper piston part by means of spindles which are connected thereto and are subjected to a spring force. The clamping elements are hinged at their upper ends whilst the lower ends of the clamping elements are constructed in the form of hooks, the mandrel-like projections being directed outwards. The lower piston part is provided on its upper side with an opening which is constructed such that the hooks of the clamping elements can engage therein so that the upper and the lower piston part are connected together during the cork-pulling procedure. Here, the upper projections of the auxiliary levers are arranged and constructed such that they act against the lower ends of the clamping elements so that the two piston parts are released when the piston arrangement is located in its bottom-most position and when there is no bottle against the widest portion of the stepped opening.

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The known corkscrew is disadvantageous in that the outer auxiliary levers have to be pressed manually against the housing during the uncorking procedure and for the subsequent removal of the pulled-out cork.

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The object of the present invention is to further develop a corkscrew of the type mentioned at the outset and to

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facilitate the uncorking procedure and also the subsequent removal of the cork from the screw.

In a corkscrew of the type mentioned at the outset, the  
5 above-mentioned object is achieved according to the  
invention in that at least one inner lever which is  
independent of the clamping lever is provided to control  
the coupling or uncoupling of the piston parts and to  
cooperate with the coupling element and a piston part, and  
10 in that the inner lever is arranged within the housing and  
hinged to the inside of the housing by its one end, the  
coupling element being arranged in a coupling position with  
mutually coupled piston parts in a first operating  
condition of the inner lever and in a release position with  
15 mutually uncoupled piston parts in a second operating  
condition of the inner lever. An essential feature of the  
invention is that the outer clamping levers for clamping  
the bottle neck on the one hand and the inner levers on the  
other are constructed independently of one another. The  
20 clamping lever and the inner lever are therefore two  
mutually separate components which are coupled together  
neither functionally nor kinematically. The inner lever  
fulfils a dual function during the coupling and uncoupling  
of the piston parts. On the one hand, it serves to move the  
25 coupling element from a coupling position into a release  
position and vice versa; on the other, the inner lever  
preferably cooperates with the lower piston part and  
prevents an axial displacement of the lower piston part  
when the upper piston part is pulled upwards in the housing  
30 of the corkscrew for the purpose of slipping off the cork.  
The clamping levers are merely provided in the housing for  
fixing the bottle or bottle neck in position. In the  
corkscrew according to the invention, there is in itself no

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need to actuate the clamping levers at all for the purpose of removing the cork. If the bottle to be uncorked is placed on a firm surface, during the uncorking procedure and the subsequent removal of the cork the clamping levers  
5 do not need to be pressed against the housing, or need only be pressed against it with a low expenditure of force. However, the contact pressure of the clamping levers serves merely to stabilise the bottle or the corkscrew on the bottle. According to the invention, the uncorking procedure  
10 and the removal of the cork from the screw are carried out irrespective of the force exerted by the user on the outer clamping levers. This increases the comfort for the user and contributes to simplifying the uncorking procedure and the removal of the cork.

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Further advantages of the invention are described below with reference to the drawing and a particularly preferred exemplary embodiment, without restricting the general inventive idea. The drawing shows:

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Fig. 1 an embodiment of the corkscrew according to the invention in a partially sectional view;

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Fig. 2 a detail of a partially sectional view of the corkscrew illustrated in Fig. 1, in the starting position;

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Fig. 3 the detail illustrated in Fig. 2 in a preparatory position before the corkscrew illustrated in Fig. 1 is placed on a bottle to be uncorked;

Fig. 4 the detail illustrated in Fig. 2, as the corkscrew is placed on the bottle;

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Fig. 5 the detail illustrated in Fig. 2, as the screw is rotated into the cork;

5 Fig. 6 the detail illustrated in Fig. 2 in the uncorking position;

Fig. 7 the detail illustrated in Fig. 2 in the preparatory position before the screw is rotated  
10 or slipped out of the cork; and

Fig. 8 the detail illustrated in Fig. 2, with the cork removed from the screw.

15 Fig. 1 shows a corkscrew 1 according to the invention having an upper piston part 4, which is arranged within the housing 2 such that it is displaceable in the longitudinal direction and is provided for mounting a screw 3, and a lower piston part 5 which is arranged within the housing 2  
20 such that it is displaceable in the longitudinal direction. The embodiment of an inventive corkscrew 1 illustrated in Figs. 1 to 8 furthermore has a lever construction having a lever 6 comprising two lever parts 7 and 8. ~~The lever 6~~ is mounted in hinged manner on the housing 2 of the  
25 corkscrew 1, to which end the housing 2 is angled away from the longitudinal centre axis at its upper end in order to displace the pivot point of the lever 6 laterally outwards. Connected to the lever 6, there are laterally mounted further levers 9 of which only one lever 9 is illustrated  
30 in Fig. 1. ~~The levers 9~~ are connected to the piston arrangement having the upper piston part 4 and the lower piston part 5; according to the exemplary embodiment shown, they are connected to the upper piston part 4. The two

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lateral further levers 9 are bent as a particular arrangement and mounting of outward displacement. The further lever mounted in hinged manner on the housing construction of the lever 6 results in 135°. As a result of the kinematic coupling lever 6 and the piston parts 4, 5, a pivotal movement of the lever 6 is converted into a translatory movement of the piston parts 4, 5 by the further lever 9.

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The corkscrew 1 furthermore has two outer clamping levers 10 which are hinged to the outside of the housing 2 and are intended for clamping a bottle neck 11 of a bottle 12, which is guided into the housing 2. In the position illustrated in Fig. 1, the corkscrew 1 is placed on the bottle neck 11 of the bottle 12, each clamping lever 10 having a clamping face of a clamping portion 13 which reaches through the housing 2 into the interior of the housing 2 for the purpose of clamping the bottle neck 11, particularly with friction fit.

Figs. 2 to 8 each show a detail of a partially sectional view of the corkscrew 1 illustrated in Fig. 1. The corkscrew 1 according to the invention has at least one coupling element 14 for coupling the piston parts 4, 5. Moreover, at least one inner lever 15 which is independent of the clamping lever 10 is provided for controlling the coupling and uncoupling of the piston parts 4, 5 and for cooperating with the coupling element 14 and a piston part 4, 5. The inner lever 15 is arranged within the housing 2 and is hinged to the inside of the housing 2 by its one end, the coupling element 14 being arranged in a coupling position with mutually coupled piston parts 4, 5

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(e.g. illustrated in Fig. 4) in a first operating condition of the inner lever 15 and in a release position with mutually uncoupled piston parts 4, 5 (e.g. illustrated in Fig. 2) in a second operating condition of the inner lever 15.

Fig. 2 shows the starting position of the inventive corkscrew 1 prior to being placed on a bottle 12 in a release position of the inner levers 15 and in the second operating condition. The inner levers 15 are arranged opposite one another and, according to Fig. 2, are located in the second operating condition with mutually uncoupled piston parts 4, 5. The inner lever 15 is hinged in the housing 2 in such a way that the free end 16 of the inner lever 15 is pivotable in the radial direction with respect to the housing 2. Moreover, the inner lever 15 is acted upon by a spring, the spring force of the spring 17 pushing the inner lever 15 into the second operating condition. The inner lever 15 furthermore has a tongue 18 which is acted upon by a spring and serves to lie against the bottle neck 11 guided into the housing 2. The tongue 12 ensures that, when the bottle neck 11 is guided into the housing 2, the inner lever 15 is moved into the coupling position or the first operating condition, even in the case of bottles 12 having a bottle neck 11 with a relatively small diameter.

It is important that the inner lever 15 has at its free end 16 an actuating portion, preferably a latching lug 19, which acts against or on the coupling element 14 at least in the release position of the coupling element 14. According to the embodiment illustrated in Figs. 2 to 8, the arrangement here is such that the coupling element 14



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is constructed as a small slide plate, i.e. in the manner of a small plate. The coupling element 14 is mounted on a bearing 20 of the lower piston part 5. The bearing 20 is composed of a pin 21 and an upper cover plate 22, the

5 coupling element 14 being constructed as a rocker and being pivotable about the bearing 20. The coupling element 14 has an upper end 23 and a lower end 24, the latching lug 19 of the inner lever 15 acting on the lower end 24 and the upper end 23 being provided to cooperate with the upper piston

10 part 4. The coupling element 14 is acted upon by a spring, the spring 25 being arranged between the coupling element 14 and the cover plate 22 of the bearing 20. The spring force of the spring 25 pushes the coupling element 14 into the coupling position. The coupling

15 element 14 furthermore has an engagement opening 26 for a pin mounted on the upper piston part 5 or for a bolt 27. It is of course equally possible for the coupling element 14 to have a latching lug which engages in a corresponding engagement opening in the upper piston part 4. It is

20 important that, in the coupling position, the upper piston part 4 and the lower piston part 5 are coupled together by the coupling element 14.

In order to simplify the cooperation between the latching

25 lug 19 and the coupling element 14, it is preferably provided for the coupling element 14 to have at its lower end 24 a sloping ramp face for the actuating portion of the inner lever 15. It is furthermore advantageous that the coupling element 14 has at its upper end 23 a further

30 sloping ramp face in order to easily enable the uncoupling procedure and the sliding of the pin 27 into the engagement opening 26 of the coupling element 14 when the upper piston

part 4 is displaced in the direction of the lower piston part 5.

In order to secure the lower piston part 5 against axial displacement in the direction of the longitudinal axis of the housing 2 when a cork 28 illustrated in Figs. 4 to 8 is removed, the embodiment of the inventive corkscrew 1 illustrated in Figs. 1 to 8 provides for the latching lug 19 of the inner lever 15 to reach behind the lower piston part 5 in the region behind a sloping ramp face 29 (illustrated particularly in Fig. 6) in the second operating condition. In the second operating condition, the lower piston part 5 is coupled to a lower stop plate 30 serving as an abutment by the inner lever 15. In this position, the lower piston part 5 lies against the lower stop plate 30. The sloping ramp face 29 facilitates the latching-in of the latching lug 19 of the inner lever 15 during the downward movement of the lower piston part 5 in the direction of the stop plate 30, the latching lug 19 firstly being pressed outwards in the radial direction with respect to the housing 2 by the sloping ramp face 29. After passing over the sloping ramp face 29, the latching lug 19 hooks behind a step 31 of the lower piston part 5. As a result, the lower piston part 5 is coupled to the stop plate 30 and held against it.

A stop 32 for the coupling element 14 is moreover preferably provided on the lower piston part 5, the stop 32 delimiting the pivotal path of the coupling element 14 and serving to secure its position. The stop 32 can preferably be constructed in a u shape, the two limbs of the stop 32 preventing the coupling element 14 from twisting about the bearing axis of the ~~bearing 20~~.

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In order to enable secure coupling of the piston parts 4, 5, not only one coupling element 14 and one inner lever 15 are provided, but in each case two, which are arranged opposite one another. Finally, the corkscrew 1 has an upper stop plate 33 which is connected to the lower stop plate 30 by guide elements 34 of which only one guide element 34 is illustrated in Figs. 2 to 8. The further levers 9 are guided through corresponding cutouts in the stop plate 33.

When the upper piston part 4 and the lower piston part 5 are displaced along the longitudinal axis of the housing 2, the piston parts 4, 5 slide along the guide elements 34, it preferably being the case that two opposingly arranged guide elements 34 are provided. The piston parts 4, 5 furthermore have through openings (not illustrated in detail) for the guide elements 34.

The screw 3 is mounted in the upper piston part 4, a nut 35 being provided in the lower piston part 5 for the purpose of guiding the screw 3 when this is displaced in the longitudinal direction. The corkscrew 1 furthermore has means (not illustrated in detail) for preventing the said nut 35 from rotating.

The uncorking procedure and the removal of the cork 28 from the screw 3 are described in detail below. In Fig. 2, the corkscrew 1 is illustrated in the starting position. The upper piston part 5 lies against the lower piston part 4, the lever 6 being arranged in the lower position illustrated in Fig. 1. The inner levers 15 are pushed into the second operating condition by the spring force of the spring 17, in which case the piston parts 4, 5 are not coupled together. The coupling element 14 is pivoted in the

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direction of the longitudinal centre axis of the housing 2 by the latching lug 19 of the inner lever 15 on the lower end 24 of the coupling element 14 so that the upper end 23 of the coupling element 14 is arranged pivoted radially outwards as a result of the rocker-type bearing of the coupling element 14. Therefore, the pins 27 of the upper piston part 4 do not come into engagement with the engagement openings 26 in the coupling elements 14. Moreover, according to Fig. 2, the arrangement in the starting position is such that the lower piston part 5 is coupled to the lower stop plate 30 by the latching lugs 19 of the inner levers 15 which reach behind the stop 31. If the lever 6 is now moved into the upper lever position illustrated in Fig. 1, the upper piston part 4 is displaced or pulled upwards in the axial direction whilst the lower piston part 5 remains in the position illustrated in Fig. 2. This is shown in Fig. 3, in which the upper piston part 4 has not moved completely as far as the stop plate 33. The position illustrated in Fig. 3 shows the corkscrew 1 prior to being placed on the bottle neck 11 of the bottle 12 to be uncorked.

Fig. 4 shows the corkscrew 1 in the condition in which it is placed on the bottle 12, the inner levers 15 being pushed radially in the direction of the inner housing wall of the housing 2 by the bottle neck 11. In this position, the latching lug 19 no longer acts on the lower end 24 of the coupling element 14, the coupling element 14 being arranged substantially parallel to the longitudinal centre axis of the housing 2 and lying on the stop 32. In this position, the coupling element 14 is located in the coupling position and the inner lever 15 is in the first operating condition. The lower piston part 5 is no longer

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coupled to the lower stop plate 30 and held against it. To uncork the bottle 12, the upper piston part 4 is moved downwards by the lever 6 starting from the position illustrated in Fig. 4, during which the screw 3 is screwed into the cork 28. If the lower piston part 4 is moved far enough downwards, the coupling element 14 is uncoupled. In the coupling position illustrated in Fig. 5, the upper piston part 4 and the lower piston part 5 are then coupled together by the coupling elements 14. Here, the pin 27 engages in the engagement opening 26 in the coupling element 14.

To uncork the bottle 12, the upper piston part 4 is moved upwards together with the lower piston part 5 by means of the lever 6, the movement of the upper piston part 4 and the lower piston part 5 being kinematically coupled by way of the coupling element 14. During this upward movement, the cork 28 is pulled out of the bottle 12. In the position illustrated in Fig. 6, the upper piston part 4 strikes against the upper stop plate 33, a projection 36 of the upper piston part 4 penetrating through a corresponding opening in the upper stop plate 33. Moreover, Fig. 6 also shows that the housing 2 has cutouts 37 which are provided for guiding the bearing 20. After the bottle 12 has been uncorked, the bottle 12 is guided out of the housing 2. The inner levers 15 are thus again moved into the first operating condition.

To remove the cork 28 from the screw 3, the upper piston part 4, together with the lower piston part 5, is moved downwards by moving the lever 6 into the lower position. During this downward movement, the upper piston part 4 and the lower piston part 5 are firstly still coupled together

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by the coupling element 14. As soon as the lower end 24 of the coupling element 14 comes into contact with the latching lug 19 of the inner lever 15, the coupling element 14 is pushed into the release position and the piston parts 4, 5 are uncoupled. This is shown in Fig. 7. Then, to pull out the cork, the upper piston part 4 is again moved upwards, in which case the lower piston part 5 is coupled to the lower stop plate 30 by way of the latching lug 19 of the inner lever 15 and held against said stop plate, and the movement of the upper piston part 4 cannot ensue. This results in a relative movement between the upper piston part 4 and the lower piston part 5, during which the screw 3 is unscrewed from the cork 28 and released from the cork 28, as illustrated in Fig. 8.

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## Claims

1. A corkscrew (1) having an upper piston part (4), which is arranged within a housing (2) such that it is movable in the longitudinal direction and is provided for mounting a screw (3), and a lower piston part (5) which is arranged within the housing (2) such that it is movable in the longitudinal direction, having at least one coupling element (14) for coupling the piston parts (4, 5) and having two outer clamping levers (10) hinged to the outside of the housing (2) for the purpose of clamping a bottle neck (11) guided into the housing (2), characterised in that at least one inner lever (15) which is independent of the outer clamping lever (10) is provided to control the coupling or uncoupling of the piston parts (4, 5) and to cooperate with the coupling element (14) and a piston part (4, 5) and in that the inner lever (15) is arranged within the housing (2) and hinged to the inside of the housing (2) by its one end, the coupling element (14) being arranged in a coupling position with mutually coupled piston parts (4, 5) in a first operating condition of the inner lever (15) and in a release position with mutually uncoupled piston parts (4, 5) in a second operating condition of the inner lever (15).

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2. A corkscrew according to Claim 1, characterised in that the inner lever (15) is hinged in such a way that the free end (16) of the inner lever (15) is pivotable in the radial direction with respect to the housing (2).

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3. A corkscrew according to Claim 1 or 2, characterised in that the inner lever (15) is acted upon by a spring, the

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spring force pushing the inner lever (15) into the second operating condition.

4. A corkscrew according to one of the preceding claims,  
5 characterised in that a tongue (18), which is preferably  
acted upon by a spring and serves to lie against the bottle  
neck (11) guided into the housing (2), is provided on the  
inner lever (15).
- 10 5. A corkscrew according to one of the preceding claims,  
characterised in that the inner lever (15) has on its free  
end (16) an actuating portion, preferably a latching  
lug (19), which acts against the coupling element (14) at  
least in the release position of the coupling element (14).  
15
6. A corkscrew according to one of the preceding claims,  
characterised in that a small slide plate is provided as  
the coupling element (14).
- 20 7. A corkscrew according to one of the preceding claims,  
characterised in that the coupling element (14) is  
pivotably mounted in a bearing (20) of a piston part (4,  
5), preferably on the outside of the lower piston part (5).
- 25 8. A corkscrew according to one of the preceding claims,  
characterised in that the coupling element (14) is  
constructed as a rocker having an upper end (23) and a  
lower end (24), the inner lever (15) acting on the lower  
end (24) and the upper end (23) cooperating with the upper  
30 piston part (4).
9. A corkscrew according to one of the preceding claims,  
characterised in that the coupling element (14) is acted



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upon by a spring, the spring force acting on the coupling element (14) preferably pushing the coupling element (14) into the coupling position.

5 10. A corkscrew according to one of the preceding claims, characterised in that the coupling element (14) has at least one engagement opening (26) for a latching means, preferably for a pin (27) on the upper piston part (4) or the like, or in that the coupling element (14) has a  
10 latching lug.

11. A corkscrew according to one of the preceding claims, characterised in that the upper piston part (4) has an engagement opening for a latching means.  
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12. A corkscrew according to one of the preceding claims, characterised in that the coupling element (14) has at its lower end (24) a sloping ramp face for the actuating portion of the inner lever (15).  
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13. A corkscrew according to one of the preceding claims, characterised in that the coupling element (14) has a further sloping ramp face at its upper end (23).  
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14. A corkscrew according to one of the preceding claims, characterised in that the lower piston part (5) has a sloping ramp face (29) for the actuating portion of the inner lever (15), the actuating portion reaching behind the sloping ramp face (29) in the second operating condition.  
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15. A corkscrew according to one of the preceding claims, characterised in that the lower piston part (5) has a

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stop (32) for the coupling element (14), the stop (32) delimiting the pivotal path of the coupling element (14).

16. A corkscrew according to one of the preceding claims, characterised in that a guide is provided on the lower piston part (5) to prevent the coupling element (14) from twisting about the bearing axis of the bearing (20).

17. A corkscrew according to one of the preceding claims, characterised in that two opposingly arranged coupling elements (14) are provided on the lower piston part (5).

18. A corkscrew according to one of the preceding claims, characterised in that the clamping lever (10) has a clamping face which reaches through the housing (2) into the inner region of the housing (2) and is intended for clamping the bottle neck (11).